

REMARKS

Claims 1-25 were pending of which Claims 1-3, 5-18, and 21-25 were rejected and Claims 4, 19, and 20 allowed. Claim 1 has been amended.

Drawings

The Examiner did not accept the substitute drawings that were previously submitted. The Examiner stated that the “drawings are objected to under 37 C.F.R. 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the ‘pulses’ of ‘same currents with opposite polarities’ of claim 25 must be shown or the feature(s) canceled from the claim(s).”

Two replacement sheets are attached hereto. In the first replacement sheet, the proposed amendments to Fig. 5 are shown, while the second replacement sheet replaces the originally filed sheet that included both Figs. 5 and 6. No amendments are made to Fig. 6. The amendments to the Fig. 5 adds no new matter, as the figure is clearly described at the paragraph starting at page 8, line 11. With regard Claim 25, amended Fig. 5 clearly shows “prepulses hav[ing] currents of approximately the same magnitudes with each prepulse having a current of an opposite polarity from an immediately preceding prepulse.”

Claim Rejections – 35 U.S.C. §102

Claims 1-3, 5-18, and 21-25 were rejected under 35 U.S.C. §102(b) as being anticipated by Chan (5,243,226). Applicants respectfully request reconsideration and withdrawal of the rejection.

Amended Claim 1 recites “passing a first pulse through said material … said first pulse is a current limited pulse”, “passing a second pulse through said material in the opposite direction of said current limited pulse”, and “current in said current limited pulse is lower in magnitude than the current in said second pulse, and wherein said current limited pulse is passed through said material prior to any other pulse.” Chan fails to teach that the first pulse (pulse 210.1) has a current that is lower in magnitude than the current of the second pulse (pulse 210.2).

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In the rejection, the Examiner stated

Reference is made to Cols. 3-4 of Chan which express that the provision of I2 being less than I1 is merely as an example. It is

clear from Cols. 3-4 of Chan (as well as other portions thereof) that the disclosed circuit is not limited to I2 being less than I1. It is further clear that one skilled in the art will get similar results wherein I2 is greater than I1, however, the reduction of resistance of the [sic] will not be as consistent.

Applicants respectfully disagree. Chan does not explicitly or implicitly teach that pulse 210.1 of Fig. 2 can have a lower magnitude current than the pulse 210.2. In fact, to the contrary Chan explicitly states that the current I1 of pulse 210.1 is greater than the current I2 of the second pulse 210.2. Col. 3, lines 65-66; col. 4, lines 8-14; Table 1; Table 2; col. 4, line 67-col. 5, line3; and see col. 6, lines 40-45; col. 13, lines 2-3; col. 13, lines 15-20. For example, in columns 3 and 4, Chan discusses experiments where I1 was greater in magnitude than I2. See, Table 1 and Table 2 and accompanying text. Chan further notes that in other experiments, I1 was between 11.6 mA and 45 mA and I2 between -9mA and -35mA. Chan states “In each experiment, current I2 was 20-25% lower in magnitude than current I1.” Col. 5, line 1-3.

It is black letter law that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (emphasis added); see MPEP §2131. The Examiner has not cited any disclosure in Chan that the first pulse has a current that is lower in magnitude than the current in the second pulse. While the Examiner implies such a disclosure, stating “[i]t is clear from Cols. 3-4 of Chan (as well as other portions thereof) that the disclosed circuit is not limited to I2 being less than I1”, contrary to the Examiner’s assertion, Applicants can find no disclosure or suggestion in Chan that I1 can be less than I2. Accordingly, Claim 1 cannot be anticipated by Chan.

In addition, Applicants submit that Claim 1 is not obvious in light of Chan, as Chan does not provide a suggestion or motivation to include a first pulse with a current that is lower in magnitude than the current in a second pulse, “wherein said [first] current limited pulse is passed through said material prior to any other pulse”.

Applicants submit, in fact, that Chan teaches away from I1 being less than I2. Chan specifically teaches that “[r]educing |I2| runs against the general rule that a greater current through the antifuse provides lower resistance.” Col. 4, lines 14-16. Chan describes the

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discovery that by providing a pulse 210.2 with current I2 after a pulse 210.1 with current I1, (where I1>I2) reduces the average resistance as well as reduces the standard deviation of the resistance. Col. 4, lines 3-6.

Applicants submit that if one of ordinary skill in the art were to deviate from the discovery disclosed in Chan, i.e., that I1>I2, one of ordinary skill in the art would follow the “general rule” as stated in Chan, which is to not reduce the current of any pulse.

Applicants note that in the Examiner’s response to Applicant’s previous remarks, the Examiner stated “[a]lthough it is clear that the reference to Chan prefers that current I1 be greater than I2, it is further clear that I1 can in fact be less than I2 and one would still obtain the benefit of the invention, although the deviation of resistance may not be as consistent.” As discussed above, Applicants respectfully submit that Chan does not teach or suggest that “I1 can in fact be less than I2 and one would still obtain the benefit of the invention”.

If the Examiner wishes to maintain this rejection, Applicants respectfully request clarification for the record of the statements that “[i]t is clear … that the disclosed circuit is not limited to I2 being less than I1” and “it is further clear that I1 can in fact be less than I2 and one would still obtain the benefit of the invention”. Applicants do not believe that it is “clear” and that the record should be clarified prior to appeal. See MPEP § 706.07.

Thus, Claim 1 is not anticipated or rendered obvious by Chan. For at least the same reasons, Claims 2-3 and 5-8, which depend from Claim 1, are therefore patentable over Chan.

In addition, Applicants point out that Claim 2 recites “wherein said current limited pulse and said second pulse have approximately the same voltage with opposite polarity.” Claim 5 states that “passing said current limited pulse through said material comprises applying a first voltage to said first conductive element and applying a second voltage to said second conductive element” and “passing said second pulse through said material comprises applying said second voltage to said first conductive element and applying said first voltage to said second conductive element.”

Chan, on the other hand, does not teach or suggest that the first pulse 210.1 and the second pulse 210.2 have the same voltages. In fact, Chan explicitly teaches that the pulse

210.1 has a voltage of 13V while the second pulse has a voltage of 9V. Col. 6, lines 40-45; Col. 13, lines 2-3; Col. 13, lines 15-16. Thus, Chan does not teach or suggest Claims 2 or 5.

Independent Claim 9 recites “applying a prepulse to said material, said prepulse having a current of a first magnitude” “applying a programming pulse to said material, said programming pulse having a current of a second magnitude” and “wherein said current of said first magnitude is lower than said current of said second magnitude, and wherein said prepulse is applied prior to applying any programming pulses”.

Applicants submit that Claim 9 is patentable over Chan for reasons similar to those discussed above in reference to Claim 1. Claims 10-18 depend from Claim 9, and thus are patentable for at least the same reasons.

Further, Claim 11 recites “said prepulse has a first voltage applied to said first conductive element and a second voltage applied to said second conductive element” and “said first programming pulse has said second voltage applied to said first conductive element and said first voltage applied to said second conductive element”. As discussed above in reference to Claims 2 and 5, Claim 11 is patentable over Chan.

Independent Claim 21 recites “applying a first voltage across said material and a first current through said material” and “applying a second voltage across said material and a second current through said material, said second voltage having the same magnitude and opposite polarity as said first voltage, said second current having a greater magnitude and opposite polarity as said first current”.

Applicants submit that Claim 21 is patentable over Chan for reasons similar to those discussed above in reference to Claim 1 and Claims 2 and 5.

Independent Claim 22 recites “applying at least one prepulse to said material, said prepulse including a first current” and “applying at least one programming pulse to said material after the application of said at least one prepulse, said programming pulse including a second current having a greater magnitude than said first current”.

Applicants submit that Claim 22 is patentable over Chan for reasons similar to those discussed above in reference to Claim 1. Claims 23-25 depend from Claim 22 and are therefore patentable for at least the same reasons.

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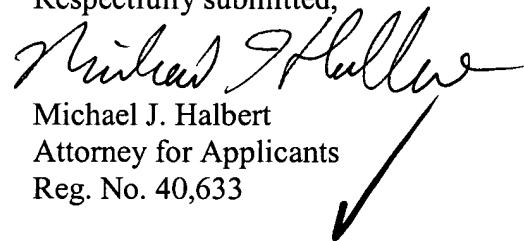
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Further, Claim 23 recites "wherein said prepulse and said programming pulse have the same magnitude voltages with opposite polarities." As discussed above in reference to Claim 2 and 5, Claim 23 is patentable over Chan.

Claims 1-25 are pending of which Claim 1 is amended and Claims 4, 19, and 20 have been allowed. For the above reasons, Applicants respectfully request allowance of Claims 1-25. Should the Examiner have any questions concerning this response, the Examiner is invited to call the undersigned at (408) 982-8202.

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